Note

The Role of Vernal Pools in the 1992 Mass Dispersal of Vanessa cardui (Nymphalidae) with New Larval Hostplant Records

Vernal pools are small depressions, underlain by hardpan or dense clay, in the grasslands of the Cental Valley. Winter rainfall perches above the impervious subsoil and slowly evaporates as a result of increasing temperatures in the spring. During mid-to-late spring, vernal pools are islands of fresh vegetation in an otherwise dry landscape. The flowering forbs within the pools are predominantly native with a high proportion of endemics. Many of these plants require a specific inundation period. This results in the vernal pools containing concentric rings of different plants, each with their own uniquely colored blooms. The historic extent of vernal pools has been severely diminished by agricultural conversion and urban expansion. For all of these reasons, vernal pools have long attracted botanists.

In western Tehama County, several areas of vernal pool formations remain. During a visit to these pools on April 14-16th, I observed the mass *Vanessa cardui* migration through the area. The painted ladies were flying in great numbers in a NNW direction with individuals often stopping to nectar on *Navarretia leucocephala* Bentham (Polemoniaceae). In some small (<30 sq. meters) pools, as many as 50 individuals were nectaring on this low growing, white-flowered vernal pool endemic. The *Vanessa cardui* were not observed to nectar on other species even though several were blooming.

During a subsequent visit on April 27-29th, the numbers of *Vanessa cardui* migrating through the area were significantly lower. Upon close inspection of the vernal pool plants, I observed many early instar larval nests on *Psilocarphus brevissimus* Nuttall (Asteraceae: Inuleae), another vernal pool endemic. Random transect placements in several of the small, shallow vernal pools yeilded an average of >100 larval nests per square meter. Larger pools, which had been partially inundated during the height of the migration, had many larval nests on the margins and few in the center. Extremely deep pools, which had been completely inundated during the migration had only an occasional larval nest.

Many third and fourth instar larvae were also observed during the late-April field visit. These larvae had left their nests and were apparently in search of fresher food. Most were eating adjacent *Psilocarphus brevissimus*. However, some larvae were observed on *Psilocarphus tenellus* Nuttall, *Micropus californicus* Fischer & Meyer and *Filago gallica* Linnaeus (Asteraceae: Inuleae), plus *Achyrachaena mollis* Schauer (Asteraceae: Madiinae) and *Plagiobothrys stipitatus* var. *micranthus* (Piper) Johnston (Boraginaceae). Although *Eryngium* (Apiaceae) is cited as a larval host plant in *The Butterflies of North America* (Scott, 1986), none were observed on the *Eryngium vaseyi* Coulter & Rose occurring in the vernal pools. Several large larvae were collected from the Tehama County vernal pool site. These were successfully reared on *Psilocarphus brevissimus* with pupation beginning on May 2nd and emergence beginning on May 9th.

A final field visit was conducted on May 5-6th and many newly emerged *Vanessa cardui* were observed migrating. However, the preceeding week had been 15-20° F above local average temperature and most of the remaining early

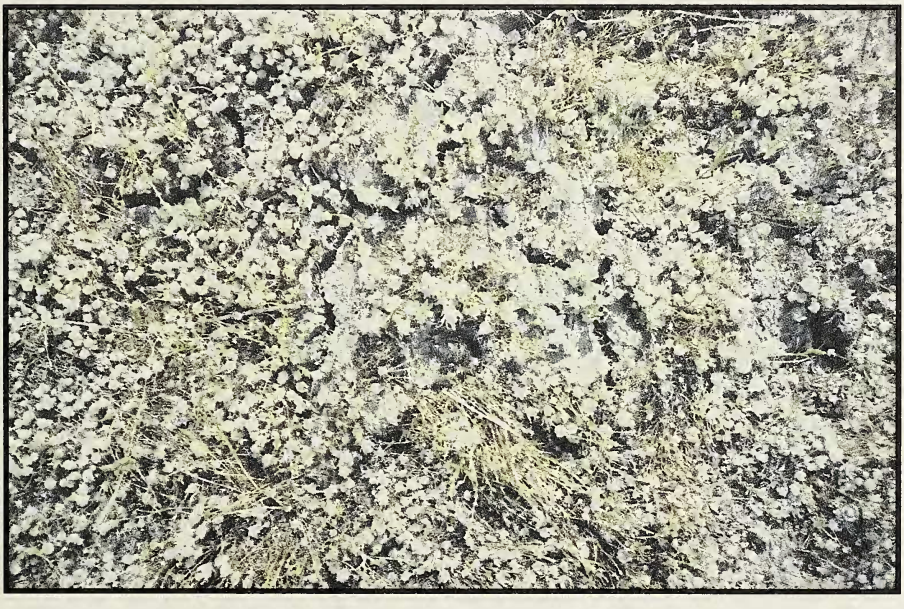

Photo 1: Typical vernal pool from western Tehama County.
Photo 2: *Psilocarphus brevissimus*, a vernal pool endemic plant and new larval hostplant record for *Vanessa cardui*.

instar larvae were found dead in their nests on the dessicated hostplant. Larger larvae were observed moving from plant to plant.

Following the discovery of *Vanessa cardui* larvae on vernal pool endemic plants, a quick reconnaissance of vernal pools in Glenn, Colusa, Sacramento and Solano counties was made. On May 5-7th, several vernal pool formations were visited and *Vanessa cardui* larvae or larval nests were observed at each site on *Psilocarphus brevissimus*. At two sites in Solano County, later instar larvae were also observed on *Evax caulescens* (Bentham) Gray (Asteraceae: Inuleae).

Of considerable significance is the lack of adult nectar sources at some of the vernal pool sites. The terrace soil formation vernal pools in Tehama County are dominated by *Navarretia leucocephala* and *Psilocarphus brevissimus* which places an adult nectar source and the hostplant in close proximity. However, the basin soil formation vernal pools in Solano County contain very little or no *Navarretia leucocephala* and relatively small amounts of *Psilocarphus brevissimus*. Nevertheless, these pools contained a similar ratio of larvae to hostplant. From these observations we may deduce that use of *Psilocarphus brevissimus* as a larval hostplant was not purely adventitious.

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